

REMARKS

Reconsideration and allowance of this application, as amended, is respectfully requested.

This Amendment is in response to the Office Action dated June 28, 2004. Appreciation is expressed for the allowance of claims 7, 8/7, 9 and 10 and the indication of allowable subject matter in claims 4, 8/5 and 8/6.

By the present Amendment, new sheets of drawing are provided for Figs. 2, 7 and 8 in response to the approval of the proposed drawing changed filed on June 25, 2003. Appreciation is expressed for the approval of these proposed drawing changes.

Also by the present Amendment, dependent claims 4, 8/5 and 8/6 have each been rewritten into independent form to place them in condition for allowance, in light of the indication of allowable subject matter in the Office Action. With regard to this, it is noted that claim 8/6 has been rewritten into independent form as the newly submitted independent claim 18. The present currently amended claim 8 corresponds to the previously dependent claim 8/5. Claim 8/7 is now presented as new dependent claim 19 (dependent upon claim 7). In light of the indication of allowable subject matter in the Office Action, allowance of claims 4, 8, 18 and 19 is respectfully requested.

Also by the present Amendment, independent claims 1, 5 and 6 have each been amended to clarify distinctions of these claims over the cited prior art, as will be discussed below.

Briefly, the present invention is directed to an improved throttle system to reduce air leakage in the area of the throttle valve. Referring to Fig. 3, Applicants'

AMENDMENTS TO THE DRAWINGS

The attached two sheets of annotated drawings and two sheets of replacement drawings representing Figs. 1, 2, 7 and 8 are attached hereto as Appendix A.

studies have shown that an undesirable leakage can occur in an area shown by the numeral 39B around the shaft 7 holding a throttle valve 5, particularly when the throttle valve 5 is in a closed position. More specifically, the undesirable leakage path from the upstream side to the downstream side of the throttle valve 5 extends along the lines indicated with the numerals 39a, 39b and 39c. In particular, this leakage occurs because the through hole in the area shown with the numeral 25 is formed to have a larger diameter than the shaft 7 "in order to prevent excessive friction, abrasion, or seizure, which can be caused by contact with the rotating shaft 7." (Page 7, lines 22 et seq.). As noted on page 7, line 24 et seq., the combination of the gap 35, formed between the through hole 25 and the shaft 7, and the gap 37 (which is part of the follow side step recession 29) permits the airflow between the upstream side and the downstream side of the throttle valve 5, leading to the leakage airflow indicated with the numeral 39b. As noted on page 8, line 23 et seq., this "can be a factor in the deterioration of the precision in airflow control."

Accordingly, the present invention is directed to preventing this undesirable airflow between the upstream side and the downstream side in the follow side step recession 29 area of the throttle system. Referring to the first embodiment shown in Fig. 5, solely for purposes of example, a seal material 43 is provided in the gap 37 to stop the undesirable air leakage 39b shown in Fig. 3 (e.g., see page 9, line 1 et seq.). In particular, as defined on page 9, line 7 et seq.:

"The seal material 43, the outer diameter of which is equal to or smaller than, but nearly equal to, the diameter of the clearance 29b, is made into a doughnut shape having a through hole, the diameter of which is equal to or larger than, but nearly equal to, the diameter of the shaft 7."

As noted on page 9, line 13 et seq.:

“Thus, the seal material 43 produces a sealing effect at each contact area, preventing the air that flows out of the suction passage 3 through the gap 35 between the through hole 25 and the shaft 7 from entering into the downstream side of the suction passage 3 and into the anti-friction bearing 31 side.

As such, the doughnut shaped seal material 43 serves to overcome the previous problem of the undesirable air leakage (indicated by the line 39b in Fig. 3) which has existed in prior throttle systems.

Reconsideration and allowance of amended independent claims 1, 5 and 6 over the cited prior art to Hara (JP 10-103080), whether considered alone or in combination with Araie is respectfully requested. As noted above, by the present Amendment, each of these independent claims has been amended to define:

“wherein said seal structure [material] forms a doughnut shape having said through hole therein of which a diameter is equal to or larger than, but nearly equal to, a diameter of said shaft” of said throttle valve to prevent air leakage between an upstream and a downstream side of said throttle valve.”

In other words, each of these independent claims defines the structure such as described on page 9, line 7 et seq., for example, of the seal material 43 having a doughnut shape with the through hole therein, the diameter of which is equal to or larger than, but nearly equal to, the diameter of the shaft (e.g., indicated by the numeral 7 in Fig. 5). As such, it is respectfully submitted that each of these independent claims now clearly define over the cited reference to Hara.

With regard to the reference to Hara, although this is of general interest, it is noted that it is actually directed to a different problem than that resolved by the present invention. In particular, Hara is directed to avoiding air leakage between an

inner portion of the throttle body and the outside atmosphere. Therefore a bearing structure is provided in Hara to seal between the throttle body and the outside atmosphere. As such, this differs from the present invention which provides the doughnut shape seal structure to avoid leakage between the upstream and the downstream side of the throttle valve itself. Regarding this, the present claims clearly define the operation of the doughnut shape seal structure to prevent air leakage between the upstream and downstream sides of the throttle valve. Therefore, it is respectfully submitted that the amended independent claims 1, 5 and 6 clearly define over the structure of Hara.

More specifically, in the bearing structure used in Hara, the seal face is provided at the end portion side (indicated by the reference sign 23A in Fig. 1 of Hara). Accordingly, it can be seen that air can leak from the upstream side to the downstream side of the throttle valve through a portion indicated with the reference sign 23B inside the seal face. As such, Hara clearly fails to teach or suggest the features defined by the amended independent claims 1, 5 and 6. Therefore, reconsideration and allowance of these claims, together with their dependent claims is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus,


Application No.: 10/602,641
Art Unit: 3747

Docket No.: 503.42787X00
Page 16

LLP Deposit Account No. 01-2135 (Docket No. 503.42787X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By 
Gregory E. Montone
Reg. No. 28,141

GEM/dlt

1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666